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Methods of Testing Results of Industrial Training Studied

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Industrial training is becoming recognized as one of the more-significant activities of management. Training done by business itself has increased three-fold since 1939.[1] The close relationship of training to organization and management as well as to the operation of a business is becoming more widely recognized. The great expansion of government and private training programs during the war, typified by the "Training Within Industry" program, helped bring about this recognition. The continued high level of industrial training has been both a further cause and an effect.

In an effort to discover the strengths and weaknesses of current training programs, a survey was undertaken early in 1947 by a representative group of industrial trainers, the Training Association of Southern California. A principal object was to discover how best to measure the results of training. Many training and management men have felt, and some still do, that training results were too intangible to be measured, and should be taken for granted. The results of the survey, however, showed that, with proper methods, many types of training could be evaluated quite concretely. These results are of significance not only for training people but for all managers faced with problems of managerial control which call for specific judgments of "intangible" activities.

A brief resume of the nature of training and evaluation will serve to point up the findings. Training is distinguished from education. Training is specific instruction in a skill or knowledge, or both, needed to perform a particular job. Education is broader in scope; it provides the general background needed for the job or for a group of jobs; the two processes overlap one another considerably. The closer the instruction relates to a specific job the more apt it is to be given on the job in the plant, office, or store—that is, in industry.

Evaluation, in simple terms, is the comparison of results with objectives. When, in addition, we take action

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[1] National Industrial Conference Board, Inc., "Personnel Activities in American Business, Revised," *Studies in Personnel Policy* No. 86, Nov. 1947. 36 p.

ARTICLES OF INTEREST IN THIS ISSUE

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Income-Tax Statistics Measure Oregon Business Activity. By Brock Dixon

Current Business Trends in Oregon

Income-Tax Statistics Measure Oregon Business Activity

FILE COPY

Bureau of Business an Economic Research

By BROCK DIXON[1]

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A study of Federal personal income-tax statistics for the decade beginning January 1, 1936 provides another verification for the commonly accepted belief that Oregon enjoyed, during the war, an increase in prosperity greater than that of the nation as a whole. Such a study also indicates that, as a measure of economic activity, total net income from Federal income-tax returns is roughly comparable to, though more sensitive than, the more ofter employed income-payment statistics. There is also a suggestion that the problem of income-tax evasion may be overrated.

The present study compares total Oregon income with total taxable income as reported on Federal income-tax returns filed by Oregon residents and makes a similar comparison for the nation.[2] For each year taxable income was computed as a percentage of total income. The results are shown in Chart I.

The period of very rapid rise on Chart I, 1940, 1941, and 1942, coincides with the period of reduced exemptions, so this rise is no indication in itself of increased economic activity. Obviously, as exemptions are reduced or as incomes increase, a greater proportion of total income will be subject to tax. However, in a period when there are no substantial changes in tax laws and rates, an increase in the ratio of taxable income to total income indicates among other things increases in business activity, i.e., increases in profits and wages above the exemption point. Therefore much of the significance of the

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[1] This is the fourth in a series of articles on Oregon economic development prepared by graduate students under the direction of Dr. Paul W. Ellis, associate professor of economics, University of Oregon.

[2] The term "total income" is used here to refer to the Department of Commerce "income payments" series, which includes all income of individuals except capital gains and a few other items of minor importance. By "taxable income" we here mean statutory net income or the amount remaining after business expenses and after personal deductions such as contributions, interest, and taxes are subtracted from total income reported for Federal income-tax purposes. The 1944 and 1945 statistics available were for adjusted gross income; therefore the personal deductions have not been subtracted from the total for those years.

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Income-Tax Statistics Measure Oregon Business Activity

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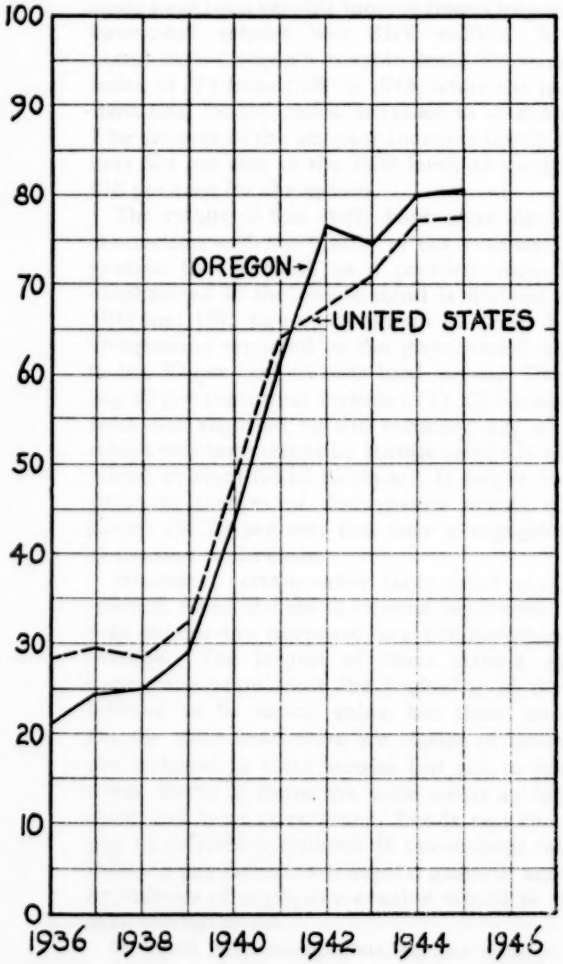
charted information lies in the time period in which Oregon's taxable income as a percentage of total income first rose above that of the United States.

Oregon's new position in this respect is particularly remarkable in view of her position at the beginning of the decade covered in this study. In 1936, of a total Oregon income of $560 million, only 21 per cent or $118 million was reported as taxable income on Federal income-tax returns. Oregon then ranked well below the nation as a whole, which in that year included 28 per cent of a total income of $68 billion as taxable income. At the close of the decade, 81 per cent of Oregon's total income appeared as taxable income on the returns, while only 77 per cent of the nation's total income was reported as taxable. Inspection of these relationships as shown in Chart I for the decade reveals clearly a definite and fairly steady rise in Oregon's position compared to that of the whole United States.

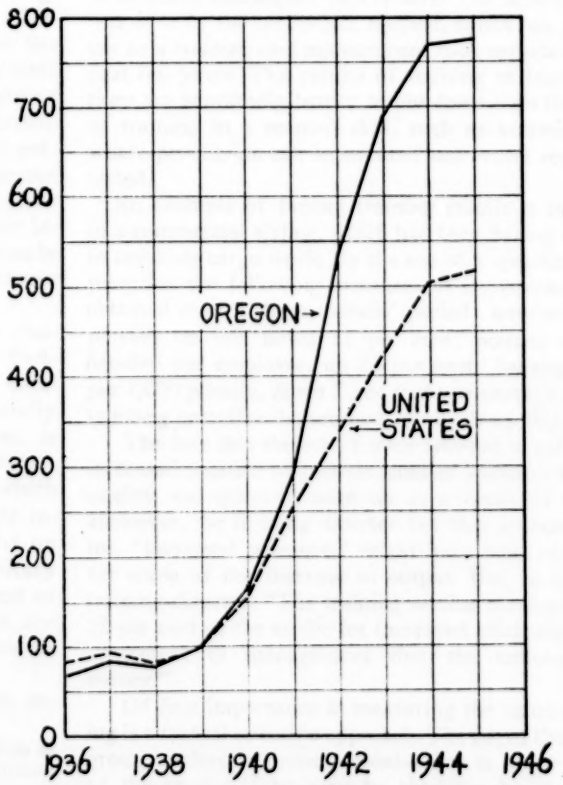
The slight relative drop for Oregon in 1943 is intriguing but not explicable on the basis of the present study. The sudden growth of Oregon's military population about that time, whose pay appears in total income but not in taxable income, may account for some of the relative drop. Another possibility is that a great number of war workers coming to Oregon in 1943 may have filed their Federal returns in the state of their prior or permanent residence, although their earnings in Oregon would be reflected in the total income statistics of the state. It

CHART I. TAXABLE INCOME[1] AS A PERCENTAGE OF TOTAL INCOME,[2] OREGON AND THE UNITED STATES. 1936-1945.[3]



[1] Taxable income as used here means the amount remaining after all business expense, and after contributions, interest, and taxes have been subtracted from total income reported for Federal income-tax purposes.
[2] Total income is all income of individuals except capital gains and a few other items of minor importance.
[3] Sources: *Statistics of Income*, Part I, 1936-1945, U. S. Bureau of Internal Revenue, Washington, D. C. *Survey of Current Business*, Aug. 1947, U. S. Dept. of Commerce, Washington, D. C.

CHART II. TAXABLE INCOME[1] OF OREGON AND THE UNITED STATES. 1936-1945.[2]
Indexes: 1939 = 100



[1] See Chart I, note 1.
[2] Source: *Statistics of Income*, Part I, 1936-1945, U. S. Bureau of Internal Revenue, Washington, D. C.

can be readily shown that the military factor alone could be the explanation.[3]

The present study of the relationship between total income and taxable income provides a supplement to total income as a measure of business activity by demonstrating the relative flexibility of taxable income and its sensitivity to changes in profits and wages above the exemption point. Thus in the prosperous war years most of the additions to total income were at individual-income levels above the exemption point. Each of such additions therefore contributed as much money to taxable income as to total income, thereby increasing the ratio of the former to the later.

Total taxable income for Oregon and the United States is compared in Chart II. For purposes of the comparison, 1939 is taken as the base year, i.e. 100, and changes were computed from that point. Total taxable income from all Federal income-tax returns for that year amounted to $23,192 million. At the same time total taxable income from Oregon Federal income-tax returns was $170 million. It will be noted that Oregon's taxable total increased to an index of 774 from 1939 to 1945, while the taxable income total for the nation increased to an index of 518. The amount of the six-year increase for Oregon was thus 674 per cent of the 1939 level, as compared with 418 per cent for the nation.

The results of this study have some significance in connection with the matter of tax evasion. The suggestion that evasion as a problem may be overemphasized in the public mind is derived from the 1944 and 1945 figures as shown in Chart I. In 1944 Oregonians reported to the government as subject to tax 80 per cent of their total income. The remaining 20 per cent must include: (1) all income of persons not required to file returns; (2) all income which was tax exempt by statute; and (3) all income which evaders failed to report. It might be that legitimate sources of discrepancy would so nearly absorb the 20 per cent that only a negligible amount of evasion could exist.

However, certain other facts must also be considered. Some classes of income, reportable for Federal income-tax purposes, are not included in total income. (The largest of these classes, especially during the years since the beginning of the war, is believed to be capital gains, but there are others.) On the other hand there are classes of income which are included in total income but not in taxable income. Some of these are such items as interest on state and local government bonds and the military pay of enlisted personnel. If tax-exempt interest or military pay far exceeds capital gains in amount, the hypothesis of negligible evasion would be considerably strengthened.

It would be presumptuous, on the basis of this investigation, to do more than hazard the opinion that only a minor percentage of total income improperly escapes taxation. It should be noted, however, that even a small percentage may represent a very considerable sum of money. One per cent of evasion would have been almost $2 billion for 1945.

[3] Oregon's 1943 total income was $1,572 million. The drop in Chart I is about 2 per cent, approximately $31 million. The annual pay of as few as three army divisions would probably amount to more than this.

Methods of Testing Results of Industrial Training Studied

(Continued from page 1)

to maintain good results or to improve poor results, we have the elements of management control over the activity in question.

The 1947 survey showed that wide varieties of types of training were being carried on, with equally wide varieties of kinds of results. Over half of the companies surveyed were carrying on some kind of training of production workers. Typical measures of the results were such things as increases in production, decreases in spoilage or complaints, lower turnover of workers, especially during the learning period, and improved feelings because of better adjustment of the worker to the shop and to his fellow workers. The most-widespread type of training found in progressive companies was training in human relations, followed closely by training in safety. These types of training, incidentally, were chiefly given to foremen and higher supervisors. The actual training was done by the conference method, which has grown in use as a training and management tool, especially in the past ten years. The results of training in human relations are admittedly harder to pin down than the results of training in a manual skill, such as assembly work where production can be counted and errors readily detected.

An example of factual training results is the report of a commercial airline, which had been having difficulty in handling cargo work. By the use of a specific training program, the following measures of improvement were obtained over a three months' period: number of employees on job, down 11 per cent; pounds of cargo handled per employee, up 23 per cent; baggage claims per 1,000 pounds, down 7 per cent; percentage of errors in filling postoffice department forms, down 10 per cent.

The fact that the errors were reduced in spite of the increased number of pounds handled indicates that both quality and quantity went up as a result of training. However, the training director felt that an outside factor, "increased pressure," might have been responsible for some of the increase in output. But, to quote the training director, "The training section assumed at least 25 per cent of the credit for increased efficiency and got agreement in management that the training saved money."

Of first importance in measuring the value of training is a factual scientific approach. The use of the control-group method is recommended—that is, the exhibition of the results of training by showing the evidence in terms of superior performance of those trained com-

pared with those who did not get the benefits of training. The two groups must, of course, be matched on the basis of their characteristics, such as age, sex, and amount of experience. Partly because of the difficulty of securing such ideal controls, another general method of experiment, the "before and after" technique, has often been used. This is particularly effective in relation to changes in such indicators as turnover, absenteeism, and accidents.

A major difficulty in the evaluation of training is the problem technically called "the separation of the variables," that is, how much of the improvement is due to training, as compared with other factors. Keeping adequate records of output per man, training time per man, cost and savings, etc., is not easy. The analyst must get cooperation in many ways; his problem is often the homely one of getting a little extra clerical help at the right time or place.

Examples of ideal methods of evaluation can be found readily in the literature; they usually describe experimental studies which have been made and could be repeated in industry. However, practicing industrial-training men do not usually use refined techniques in their evaluations. In order to secure most of the thirty-two case studies received from trainers in the field in the Southern California Training Association survey, a very simple seven-point checklist form, "Measuring Training Results," was developed, indicating the procedural steps and providing space for reporting. This is shown as Exhibit I.

EXHIBIT I

MEASURING TRAINING RESULTS

(1) Types of training in question: .....

.....

(2) Objectives of training: .....

.....

(3) Brief picture of conditions before training (where possible, use terms that tie in with training objectives; include opinions of those concerned): .....

.....

(4) Records used to check training progress: .....

.....

.....

(5) Conditions after training, as seen in terms of (3) and (4) above: .....

.....

(6) Factors other than training that may have helped cause these results: .....

.....

(7) Net tangible and intangible results fairly credited to training:

.....

.....

Fortunately, the simplicity of the form did not prove to be a barrier to careful reporting of results; most trainers furnished supplemental data both on their evaluations and on the training programs in question. A more-extensive and explanatory checklist has been given in an earlier article, which sought to acquaint training men with the nature and purpose of the survey.[2]

[2] Edward C. Keachie, "How Effective Is Your Training Program?" *Journal of Industrial Training*, Sept.-Oct. 1947, pp. 9-14.

Case Studies. A simple example of a report on the seven-step form shown as Exhibit I concerned the training of woodsmen in a lumber operation in the Canadian northeast:

(1) Type of training in question: "Training of woodsmen, on the job training."

(2) Objectives of training: "To increase daily average wood cords per man."

(3) Brief picture of conditions before training: "Green men hired, placed on job with experienced men. Cut per day—experienced, 2¾ cords; green men after one month, 1½ cords."

(4) Records used to check training progress: "Scaler's records and production records."

(5) Conditions after training, as seen in terms of (3) and (4) above: "After instruction on four basic job units—average up to 2¼ cords. Control crews verified results."

(6) Factors other than training that may have helped cause these results: "Better appreciation of job—no other."

(7) Net tangible and intangible results fairly credited to training: "With one part-time instructor, new men brought to 'experienced' production in one month. Less time off due to fatigue."

Different in scope and objectivity is the following attempt of an automobile manufacturer to check on the results of induction training given to newly appointed supervisors:

(1) Type of training in question: "Induction training for newly appointed supervisors (40 hours—5 consecutive 8-hour days)."

(2) Objectives of training: "To bridge the gap between the hourly-rated and the supervisory job."

(3) Brief picture of conditions before training: "Technical background, selfish motives, limited interest in people, limited knowledge of corporation organization, policy and procedure."

(4) Records used to check training progress: "A battery of tests to check ability and attitudes—tests on material covered—supervisory rating scale."

(5) Conditions after training as seen in terms of (3) and (4) above: "See attached supervisory rating scale—used as follow-up at end of six weeks, one year, and two years, to correlate results of tests and training with on-the-job achievement. (Rating done by two supervisors and a training staff man.)"

(6) Factors other than training that may have helped cause these results: "Results colored by superior who is anxious to have the man recommended make good."

(7) Net tangible and intangible results fairly credited to training: "Only recently started—not gone far enough to test results."

The idea of checking supervisory training against performance ratings and tests is promising; such a check has been attempted by several firms. There are two major difficulties—the setting up of valid rating scales and tests and the determination of the extent to which training is responsible for the results. One interesting approach to the problem, which has been made as part of this survey, will be described later in this article.

The following are typical attempts to provide an objective evaluation of the results of training, reported by three companies:

(5) Conditions after training, as seen in terms of (3) and (4) above: Radio assemblers—"Reduced turnover and greater job efficiency." Mechanics—"Efficiency increase of 20 per cent to 50 per cent, less men required for standard time jobs." Comptometer

operators—"No necessity to hire additional operators; work ahead of schedule and with less effort. Improvement in operator morale."

(6) Factors other than training that may have helped cause these results: Radio assemblers—"Induction and orientation" (training processes other than the one under consideration). Mechanics—Pep talks to foremen and supervisors. Higher rate cannot be obtained until after training qualifications test is passed." Comptometer operators—"Comptometer machine company providing very capable instructor possessing personality and ability."

(7) Net tangible and intangible results fairly credited to training: Radio assemblers—"See No. 5" (reduced turnover and greater job efficiency). Mechanics—"Acknowledgment by rank and file that training is necessary for sound results. Acceptance by the union of the training method as a means for advancement." Comptometer operators—"According to supervisor's report present operators increased their output approximately 50 per cent. No further need for additional operators at $35 per week each. Present operators grateful for refresher course because they discarded bad habit patterns and relearned things about the comptometer machine from the standpoint of shape of buttons, releases, proper holding of fingers, etc."

Two additional examples show the wide possible scope of training and evaluation. The first report gives the results of training technical specialists in one small area of their work, cam design. Of especial interest is the analysis of dollar costs of training, for comparison with results. The often-mentioned "costs of not training" are pointed up in the last paragraph, which illustrates the fact that great savings in production costs may result from sound practices developed through training.

Of the original 26 who completed the basic course in cam design, 17 are now active in the advanced class. The group is mixed—engineer, scheduling, time study, methods, production, supervisors, and operators are represented.

Instruction: vocational-school instructor.

Classes held Friday 5:00-7:00 p.m. on employees' own time.

Evaluation: Seventeen employees will be potential cam designers.

Operators and setup men have been using cam layout No. 1 on Part No. 1XX10 for years. Production 20 pc/hr. Seventy hours to complete manufacture of 1400 pcs. Total labor cost: $122.30.

Cam Layout No. 2, although in stock, was never used. Knowledge and training stimulated operators' and setup men's thinking and experimenting.

Result: Production—32 pc/hr.
Total hours to manufacture 1400 pcs—32
Total labor cost—$68.25
Labor cost saving—$54.05
Approximate burden savings—$67.56

Scheduling student reports: Knowledge of feeds and speeds, machine capacity, enables him to give a more correct "backlog" on new jobs coming through his section to the manufacturing department. The latter, as a result of more-accurate reports, can schedule machines and manpower much more efficiently. Seldom repeat past errors such as predicting a two weeks' backlog only to learn that four weeks were required in manufacturing.

The other example is typical of the progressive work being done in labor relations. Too often the foreman has been the neglected stepchild of management. He receives neither the information necessary to enable him to do a good job nor adequate consideration of his own problems as an employee. The training program provided by this firm insures that the foreman will know the facts of the labor contract under which he is expected to operate. Only with such knowledge can he be expected to do a good job in handling the dissatisfactions of his men and in dealing with well-briefed union shop stewards. The evaluation is a factual approach to a problem often regarded as "intangible."

(1) Type of training in question: "Training supervisors on union contract."

(2) Objectives of training: "To give every supervisor a sound working knowledge of selected portions of our union agreement with which every supervisor should be acquainted."

(3) Brief picture of conditions before training (where possible, use terms that tie in with the training objectives; include opinions of those concerned): "Numerous grievances were being written by the union, claiming that plant supervision was not living up to management's end of the agreement; and in too many cases the grievances were justified. In analyzing the cause, it was determined that there were two factors which were responsible. (a) Some supervisors had never even read the contract. (b) Those that had read the contract frequently interpreted it to fit their needs. The condition was so bad that practically no grievances, once written, were being settled at the foreman step of the grievance procedure."

(4) Records used to check training progress: "The records maintained were the records of the number of grievances written claiming violation of the mechanics involved in handling the grievance procedure and the number of grievances settled by the foremen."

(5) Conditions after training, as seen in terms of (3) and (4) above: "The training program on the union agreement was originally set for a total of five weeks. At the end of this training period a true and false questionnaire was given and the papers were collected, although no names were required. The average of all the grades was 72.3. This result was not satisfactory and it was decided to extend the program for another five weeks. A new and different questionnaire (of equal severity with the first) was given at the end of the second five weeks and the average grade was 94.4. Since 127 men took this second test, it was looked upon as an indicator that our training had gotten across. In the three months following the completion of the program, only five grievances were written claiming violation of the mechanics of the grievance procedure. In four of these five grievances, supervision's stand was definitely correct. The percentage of grievances settled by the foreman has gradually increased to where over 20 per cent of all grievances are settled on the floor."

(6) Factors other than training that may have helped cause these results: "No other factors can be tied in with the results attained unless we would consider the added experience which each supervisor gained on his own job as a factor. In a few cases where supervision was new, that added experience probably contributed something."

(7) Net tangible and intangible results fairly credited to training: "The answers to this question have already been given above. In both examples which we have covered, top management was highly pleased with the results."

Returning again to the broad problem of evaluating supervisory training—it became apparent early in the survey that the idea of rating supervisors on their improvement in performance due to training would be a good way to judge training effectiveness. Three companies cooperated on the project. Two of them conducted an experimental trial in their plants.

A rating scale to estimate performance improvement due to training was used. It was made up of two parts, one for self-rating by the supervisor in question, and one for rating by his superior. It would also be valuable to secure ratings by subordinates, but this was not attempted in the present cases.

Rating-scale questions were based upon the objectives and content of the specific training given. Differences in objectives and training by companies necessitated differences in the wording of questions to fit each training

course. The objectivity of the method was fostered in three basic ways: (1) Reference was made directly to performance on the job rather than to the acquisition of knowledge or attitudes as a result of training. (2) Specific questions were used to objectify the thinking of the respondent, to get beyond the usual generalities. (3) The questions were tied to specific individual supervisors with respect to their work, rather than calling for a general impression of how the "average" supervisor had benefited from training.

A typical self-rating form question might be: "Have I personally made an improvement in safety practices?" The corresponding typical question asked of the superior might be: "Have safety practices in his unit improved due to his efforts?"

Most questions were set up with a choice of four columns for rating, the choices being "none," "little," "considerable," and "great." This arrangement makes it easier to answer the questions and easier to analyze the results. Some questions, however, were of the completion type, for example: "What parts of the training have contributed most (or least) to the improvement in this supervisor?" Illustrative sections of actual rating-scale forms are shown as Exhibit II.

Whenever objective data such as accident frequency rates are available, they should be used, even to the extent of being written on the form before it is handed to the rater. Opinion should be based on the best indicators available.

The inclusive dates of training form the two rough points of reference, during which the effects of training may become apparent. The ending date may well include a period after the completion of the actual course or conferences. This allows for some consolidation of knowledge, for putting ideas into practice (or, conversely, failure to follow through on improved practices), and for lags inherent in the records which are used as a partial check on performance.

The procedural steps of this method are, in brief:

(1) Plan training-program objectives in terms of desired improvements in supervisory performance.

(2) Set up rating-scale questions based on possible improvement: (a) "self-rating" form for rating by trainee; (b) "general" form for rating by superior.

(3) Use rating scale some time after training has been completed. (a) Standardize conditions as much as possible: (i) achieve uniformity in training conditions; (ii) standardize rating directions and conditions; if possible, have the individual ratings made at one time, for each level of supervision, in a conference type of meeting. (b) Use objective records to support ratings, wherever possible.

(4) Tabulate and analyze results.

Because of the limitations of space, discussion of the method of analyzing results, of the variables involved, and of the actual findings of the companies which cooperated in this evaluation experiment cannot be given here.

EXHIBIT II

SUPERVISORY TRAINING EVALUATION— COMPANIES X AND Y ILLUSTRATIVE SECTIONS OF RATING SCALE FORMS

I. Sample cover memorandum:

RE: RESULTS OF SUPERVISORY CONFERENCES

We have been asked to help in a research project being performed in conjunction with the Stanford University Graduate School of Business, the aim of which is to find out more about the results of supervisory training. Since few companies have gone into this work to the extent that we have, our ideas are being requested. Therefore, will you take a few minutes of your time to give us your real, honest opinion on the training we have engaged in? Results of the study will be available to you upon completion. Please try to answer the questions and give your criticism of the way they are arranged as well as anything else that comes to mind. It is hard to separate the effects of training from other factors, but try to answer the questions with regard to the net effects due to supervisory conference training alone. *Omit questions on which you have no information.*

II. Sample questions—these questions are illustrative only, since actual questions in any given case must be based upon the specific content of the training given; 15 to 30 questions are usually used. Extra lines under each question are provided for remarks.

	Improvement If Any			
	None	Little	Consid.	Great
A. Self-rating scale questions:				
(1) Has improved knowledge of company background and operations helped me to work more effectively? (For example, can I make better allowances for conditions which are due to operation peculiarities of plants which supply us?)				
(2) Am I giving the job better overall attention? (Have I been more careful to avoid giving too much attention to some things at the expense of others just as important?)				
(3) Cite two instances of improvements made which are a fairly direct result of training*				
B. General-form questions—rating of supervisor by his superior:				
(1) Has his work benefited from better knowledge of company background and operations? (For example, does he show better understanding of conditions which are due to operating peculiarities of plants which supply us?)				
(2) Is his supervision more uniform? (Are the high spots less exceptional—are there fewer weak spots?)				
(3) If you feel that there has been an improvement, mention the principal way he has improved, or cite some instance of improvement in his handling of his job*				

* This type of question often received very specific and complete replies.

However, an intensive analysis[3] shows that the results were measurable and significant. In particular, it was possible to show the general results of training and the relative values of the various parts of the training, and to indicate where additional training might be most effective. Specifically, the advantages of the method are:

(1) It helps force planning on the part of trainer and management.

(2) It focusses attention on accomplishment rather than activity.

(3) It is a reminder of significant aspects of training, especially of relationships between training and the job, and between parts of the training program.

(4) Free-answer spaces bring up comments of great significance, many of which would otherwise be unknown. Lack of anonymity is offset by the added value of being able to relate comments to the situation. Supplementary observations on values not covered by the questionnaire and suggestions for improvement may be made.

(5) It is an outlet for personal feelings, criticisms, or expressions of opinion not previously made for various reasons.

Analysis indicates the need for some changes in the form, such as the inclusion of a "no improvement expected" category. Further trial on a large scale should result in more-extensive finding as to both method and content. If Oregon business and industrial firms would like to adapt this technique to their problems of rating and training supervisors, the Training Association of Southern California offers its aid and would be interested in knowing the results.[4]

Conclusions. It has been pointed out that training is a personnel function of considerable significance, especially in its role as a catalytic agent responsible for increasing the effectiveness of operating departments.

The need for evaluation as a basis for management control is clearly shown. The essence of evaluation is the comparison of results with objectives. Such objectives must be stated in terms of practical standards, agreed upon in advance of training, and modified in the light of experience. Evaluation then becomes management's guide in the control of the training function.

Questionnaire techniques, to get the opinions of trainees and others as to the general and particular values of training programs are widely used. Essentially, these are a refinement of the process of evaluation by observation. When carefully done, they may provide worthwhile information not obtainable in any other way. Poorly handled, they can be worse than useless, because misleading.

Training men are much interested in the problem of evaluation, and many of them have made rewarding attempts to evaluate their own training programs. On the other hand, the careful use of scientific method in evaluation is often conspicuous by its absence. The literature contains illustrative material on how training may be precisely and extensively evaluated, but actual examples of continuing scientific evaluation in industrial practice have not been found either in the literature or through this investigation. The principal reason is probably the practical one that real evaluation is not yet widely expected by management and therefore adequate attention is not given it. When managers generally realize how great the profit-and-loss effects of training can be, they will insist on the evaluation of results.

[3] Chapter 7 of the author's doctoral thesis, *The Evaluation of Industrial Training*, Stanford University, 1948.

[4] Address communications to the author, Los Angeles State College, 855 North Vermont Ave., Los Angeles 27, Cal.

Book Review

Value of Commodity Output Since 1869. By William Howard Shaw. New York: National Bureau of Economic Research, Inc., 1947. 310p. $4.00.

For a manufacturer and businessman with imagination, this book can be a practical tool in long-term planning. For the statistical department of any business, it is an essential reference work, with data on the production of numerous products or groups of products over the period 1869-1919. Less-detailed data are shown for 1919-1939. This book supplements other material previously published by the National Bureau of Economic Research in which detailed data since 1919 are given.

Executives will be particularly interested in the character of commodities that have grown fastest in output—because of the suggestions this may offer for their own future plans. The rate of growth of durable goods was found to be one-third greater than that of nondurable goods, even before adjustments for price changes were made. But prices in the period studied increased more for the nondurable items. Accordingly, with adjustments for price changes, durable goods were found to have increased two-thirds more than the nondurable.

As in the case of all generalizations based on averages, some of the detail provides the significant explanations. For example, "most of the expansion in total consumer durable commodities was due not to older products but to three new classes: automotive equipment, household electric appliances, and radios."

Statistical technicians will be interested both in the mass of statistical series here available and in the description of methods by which totals are deflated for price changes.

Many readers will be particularly interested in the author's analysis of variation of output and price index series during business cycles. The trend of both output and prices during the period was upward, despite the effects of depressions. Typically, each cycle ended at a higher level than it began, but the rate of change was greatest during periods of contraction.

Unfortunately much of the valuable material published by the National Bureau of Economic Research goes out of print rather quickly. Firms planning to develop statistical research departments will want to obtain copies of this book before it too is unobtainable.

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CURRENT BUSINESS TRENDS IN OREGON

Employment. Despite the heavy movement of population into Oregon, the number of unemployed has declined markedly the last few months. In August 1948 the number of persons actively seeking employment dropped to 23,400, the lowest level since the end of the war. Of these individuals, 16,500 were in metropolitan Portland. Employment prospects in some specific industries are:

Construction—A steady increase of 10 per cent since May will be followed by further gains during the summer and early fall. On the basis of the reports of a sample group of employers to the Oregon Unemployment Compensation Commission, it may be predicted that November employment will remain well above the July figure and that January will not show the usual seasonal decline. There is still a demand for skilled craftsmen, but there is no shortage of unskilled workers.

Food Processing—September is the peak of employment in this industry. Last year's high of 30,000 may be exceeded if crops and prices are up to expectations. The coast fish canneries will be offering considerable employment until November.

Lumber and Logging—The immediate prospects in this industry are clouded by the maritime strike, which has caused some mills which ship largely by water to close down. Were it not for this unfavorable development, fall employment in the industry would be fully up to last year's record-breaking level.

Wholesale and Retail Trade—Jobbing and packing firms are on their way to a fall peak, but retail trade barely held its own during the summer months.

Earnings of Labor. The median earnings of Oregon laborers in industries covered by unemployment-compensation insurance for the years 1942 and 1947 is shown below:

Industry	*1942*	*1947*
All workers	$1,832	$2,703
Contract construction	1,915	2,857
Canning & preserving	780	1,836
Lumber & timber	1,836	3,016
Transportation equipment (including shipbuilding)	2,478	2,869
Wholesale trade	1,944	2,978
Retail trade	1,233	2,114
Finance, insurance & real estate	1,617	2,285
Service not elsewhere classified	1,155	2,066

Consumer Prices. Portland retail prices in July were the highest they have ever been. The Bureau of Labor Statistics consumers' price index for moderate-income families stood at 180.3 on July 15, 1948. This was up 80.3 per cent from the 1935-39 average and 2.6 per cent over the level of April 15, 1948. During the three months preceding July 15, the price of food shot up 4.7 per cent, the largest increase of any of the major items in the index. Apparel prices decreased slightly during the quarter; the particular items included in the index which were lower were: women's and girls' cotton house dresses, women's girdles, and men's pajamas. The important category of miscellaneous items was up 2.3 per cent because of the increase in the cost of automobile insurance, automobiles, transit service, and cigarettes. Decreases were reported, however, for dentist's fees, laundry and toilet soap, and face powder. The details of the index and changes since certain previous dates are given in the following table:

Group	*Index July 15, 1948 (1935-39=100)*	*Per Cent Change From Apr. 15, 1948 to July 15, 1948*	*July 15, 1947 to July 15, 1948*	*Aug. 15, 1939 to July 15, 1948*
All items	180.3	2.6	11.2	80.1
Food	233.7	4.7	15.3	143.2
Apparel	194.8	—0.6	9.2	93.4
Rent	123.2	0.6	.....	15.7
Gas & elec.	95.7	0.8	6.5	—3.3
Other fuel & ice	165.8	0.5	5.1	69.5
House frnshgs.	186.4	—0.5	6.4	86.2
Miscellaneous	133.9	2.3	8.8	51.5

Department-Store Sales. Portland department-store sales continued to compare very favorably with those of other Pacific Coast cities. The percentage changes in the value of department-store sales compared with the corresponding period a year ago are as follows:

City	*Four Weeks Ending Sept. 11, 1948*	*Calendar Year to Sept. 11, 1948*
Portland	+ 6	+11
Los Angeles	— 7	— 1
San Diego	+ 6	+11
Oakland	+ 1	+ 5
San Francisco	+ 5	+ 5
Seattle	+ 5	+ 4
Spokane	+ 5	+ 6
United States	— 2	Not available

BANK DEBITS

Bank debits represent the dollar value of the checks drawn against individual deposits. Approximately 90 per cent of all goods, property, and services is paid for by check. Bank debits are regarded as indicators of the general trend of business, though their value for this purpose may be impaired by substantial changes in the level of prices. The Bureau of Business Research collects bank debits from 96 banks and branches monthly. On occasion, the totals for the same month in different issues of the *Review* are not directly comparable because of necessary adjustments in basic data.

Marketing Districts	*Number of Banks Reporting*	*Debits July 1948*	*Debits July 1947*	*Debits June 1948*	*June 1948 Compared with July 1947*	*June 1948 Compared with June 1948*
Oregon	96	$1,008,282,656	$871,681,350	$887,734,740	+15.7%	+13.6%
Portland (Portland, Hillsboro, Oregon City, etc.)	28	616,286,205	542,474,877	533,973,181	+13.6	+15.4
Lower Willamette Valley (Salem, McMinnville, etc.)	10	84,289,499	67,782,096	66,379,362	+24.4	+26.9
Upper Willamette Valley (Albany, Corvallis, Eugene, etc.)	13	100,930,110	82,045,881	97,541,004	+23.0	+ 3.5
North Oregon Coast (Astoria, Tillamook, etc.)	5	26,512,600	21,511,781	24,611,130	+23.2	+ 7.7
Douglas, Coos Bay	5	30,750,703	27,445,602	28,593,260	+12.0	+ 7.5
Southern Oregon (Ashland, Medford, Grants Pass)	5	41,240,259	33,476,969	37,652,923	+23.2	+ 9.5
Upper Columbia River (The Dalles, Hood River, etc.)	7	17,266,673	14,578,793	14,212,105	+18.4	+21.5
Pendleton area	6	21,276,955	21,473,062	15,528,967	— 0.9	+37.0
Central Oregon (Bend, Prineville, Redmond)	4	15,843,178	12,022,244	16,128,358	+31.8	— 1.8
Klamath Falls, Lakeview area	4	27,793,235	24,078,699	26,579,923	+15.4	+ 4.6
Baker, LaGrande area	6	17,809,629	16,443,512	17,008,382	+ 8.3	+ 4.7
Burns, Ontario, Nyssa	3	8,283,610	8,347,834	9,526,145	— 0.8	—13.0

BUILDING PERMITS

Building permits give an indication of building operations planned rather than actual construction under way. Care must be taken, in interpreting these data, to allow for the lag which may elapse between the issuance of the permit and the beginning of actual construction. The data have been collected by the Bureau of Business Research.

	New Residential July 1948	*New Nonresidential July 1948*	*Additions, Alterations & Repairs July 1948*	*Totals July 1948*	*Totals July 1947*	*Totals June 1948*
Albany	$ 10,000	$ 350	$ 20,775	$ 31,125	$ 54,550	$ 82,666
Astoria	28,000	650	32,311	60,961	34,205	65,585
Baker	22,900	6,445	34,069	63,414	35,805	39,628
Bend	44,600	180,485	7,460	232,545	121,860	75,905
Corvallis	45,500	16,025	18,940	80,465	51,925	186,725
Eugene	337,575	674,000	53,562	1,065,137	295,781	627,955
Grants Pass	61,783	44,282	30,332	136,397	65,105	125,840
Klamath Falls	21,000	18,000	33,818	72,818	78,725	284,217
Medford	113,000	17,233	.....	130,233	315,480	421,125
Oregon City	11,000	15,000	8,800	34,800	55,350	35,250
Pendleton	21,100	4,000	11,900	37,000	100,225	28,210
Portland	2,357,400	2,370,340	713,190	5,440,930	2,316,815	3,477,295
Salem	356,400	235,385	98,704	690,489	292,500	2,365,340
The Dalles	26,400	9,500	4,400	40,300	22,730	60,805
21 other communities	411,050	324,161	98,065	833,276	957,667	1,456,420
Totals	$3,867,708	$3,915,856	$1,166,326	$8,949,890	$4,798,723	$9,332,966